Providing Tools to Enhance Fisheries Management: the NBII Fisheries and Aquatic Resources (FAR) Node

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Project Goals

- Provide for the integration of physical and biological themes so that decisions can be made with the best available science and data.
- Common digital databases.
- Spatially explicit display of predictive model outputs.
- Tool that can be used for analyses AND public presentation of results.

USGS

Decision support is provided for:

- Fisheries
- Wildlife
- Water Quality
- Irrigation & water supplies
- Navigation
- Cultural resources
- Recreation

USGS

The Atlas approach

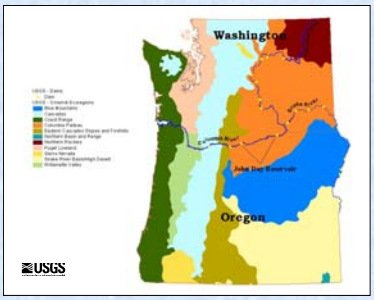
- Visual - shows what will happen as well as where it will happen
- Easy access to data & modeled results levels the playing field
- Knowledgeable user can perform additional analyses - no Atlas can be expected to do it all!
- Highlights information and data gaps
- Local vs regional decision making, but, regional needs can drive local decisions

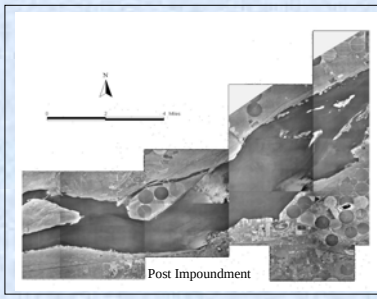
USGS

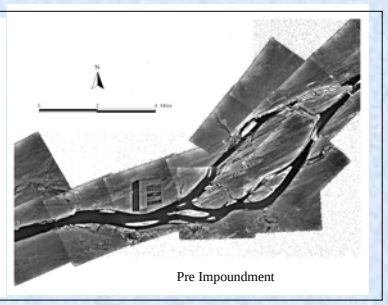
Modeled Scenarios Included

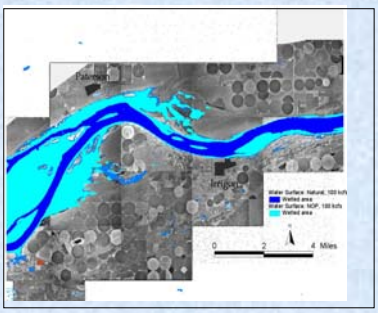
- Water surface elevations
  - Normal Operating Pool
  - Minimum Operating Pool
  - Spillway Crest
  - Natural River
- Discharges
  - 100 KCFS
  - 156 KCFS
  - 300 KCFS

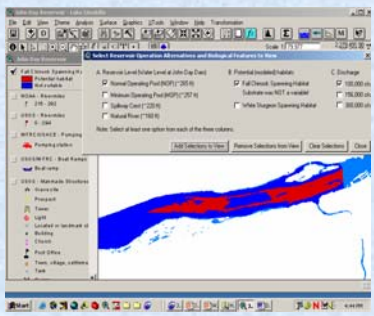
USGS

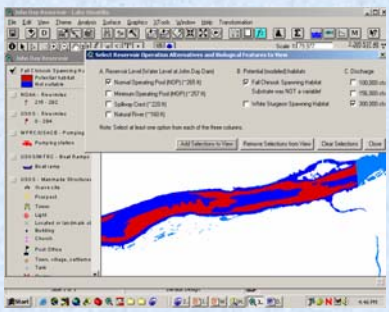


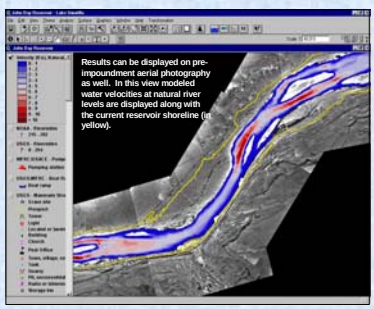


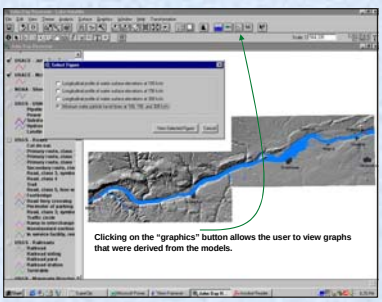


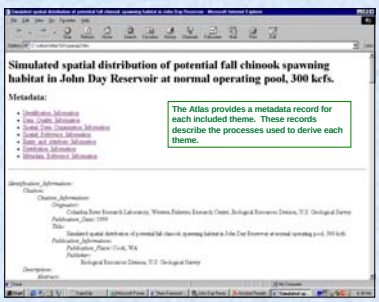


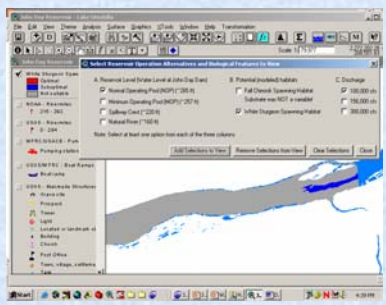


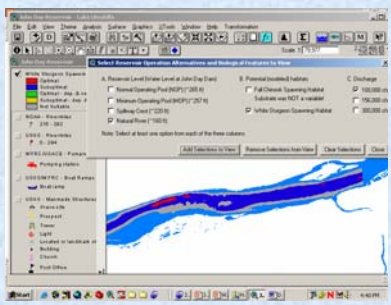












John Day Digital Atlas Project

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The John Day Atlas, which was developed by scientists at the Columbia River Research Laboratory and the Upper Midwest Environmental Sciences Center in 1999, uses geographic information system (GIS) based tools to assist managers with making decisions regarding the natural resources in and around the John Day Reservoir. The John Day Reservoir, also known as Lake Umatilla, was created in 1968 when the U.S. Army Corps of Engineers constructed the John Day Dam at river mile 215 on the Columbia River. The John Day Reservoir is 76 miles long and is bounded by John Day Dam on the western downstream end and McNary Dam on the eastern upstream end. Power generation, irrigation, navigation, angling, and windsurfing are some of society's uses of John Day Reservoir. The reservoir hosts many species of fish and wildlife, including several species of threatened or endangered salmon, and is important to migratory birds that visit or nest at the Umatilla National Wildlife Refuge and other nearby wildlife areas.

The John Day Digital Atlas was developed with ArcView and contains a set of tools that incorporate 2-dimensional hydraulic modeling to estimate effects of reservoir level and water discharge fluctuations on aquatic and terrestrial habitats. Species of interest in the reservoir are Chinook salmon (*Oncorhynchus tshawytscha*) and White sturgeon (*Acipenser transmontanus*). Different scenarios can be displayed, such as reservoir levels at high and low discharges, to simulate potential habitat that may exist at different flow regimes.

The John Day Digital Atlas has been distributed regionally on CDs and continues to be requested by consultants, environmental managers, government agencies and educators. Currently, the atlas has been cited over a dozen times in technical reports by the Army Corps of Engineers and Bonneville Power Administration, demonstrating its importance as a decision support tool to fisheries managers. A big drawback of the John Day Digital Atlas, however, is it requires ArcView software to view and query, proprietary software that most people lack. Furthermore, the distribution of the atlas on CDs restricts the number of viewers that can access it or have knowledge of it at all. We believe the John Day Digital Atlas would be viewed and used much more frequently as a decision support tool if it were web enabled, allowing anyone with a browser and an internet connection to interact with it. A web-based platform would also allow us to provide NBII compliant metadata directly to the end user with links to the FAR and Pacific Northwest nodes, plus a link to the NBII website.

Currently, we are creating an Internet Mapping Service of the John Day Digital Atlas with ArcIMS. The John Day Mapping Service is being made to look and behave in a similar fashion as the John Day Digital Atlas that we currently distribute on CD, but instead of requiring ArcView, one will only need a browser and an Internet connection. The current atlas has a user-friendly interface that allows users to examine where the river, shoreline and fish habitats (salmon and sturgeon) will be located if reservoir water levels are manipulated. Knowledgeable users can perform additional spatial analyses on the many features in the database should they choose to, like overlay, buffer, or proximity analysis. The National Biological Information Infrastructure (NBII) supported the development of the John Day Atlas in 1999 and its distribution on CD and is assisting with its conversion to an Internet Mapping Service.

Acknowledgements

Many people from a variety of organizations provided assistance with the contents of this CD. Staff at the U.S. Geological Survey's Upper Midwest Ecological Sciences Center were instrumental in the conceptual design of this project. Spatial data sets that were used to derive bathymetry were provided by Greg Bertrand of the U.S. Army Corps of Engineers. David Rupp of the USGS performed the hydraulic modeling and customized the ArcView interface. Thomas Batt and James Hatten provided new model runs and datasets. Terry Waddle (USGS Midcontinent Science Center) and Dr. Peter Steffler (University of Alberta) provided technical assistance with the hydraulic modeling. Jason Rohweder and his crew at the USGS's Upper Midwest Environmental Sciences Center performed a variety of tasks including scanning and rectifying the imagery, and providing input on customizing the ArcView Interface. Jim Guyton, Johnson Controls World Services, did most of the HTML programming for the interface you're now looking at. Thanks are also due to Mindi Sheer for

providing helpful reviews of the CD.

The National Fish Strain Registry

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Fishery managers have long sought the ability to match genetic and performance characteristics of a strain with the functional goals and habitat of a specific fishery. Three types of information are needed to make this possible: (1) performance characteristics of candidate strains; (2) habitat characteristics of the target fishery; and (3) management objectives for that fishery. The National Fish Strain Registry (NFSR) provides fisheries personnel the strain characterization information (i.e., life history, genetic, reproductive, and behavioral characteristics) needed to make informed decisions on the appropriate fish strains to be used under specific production and management programs. The NFSR is composed of four sub-registries (inland trout, catfish, sturgeon and paddlefish, and perch and pikes), each available in print and on-line through the USGS National Biological Information Infrastructure (NBII) Fisheries and Aquatic Resources (FAR) Node. The on-line version has broadened access to this valuable tool, enabling commercial and public fisheries managers to research strains of stock according to disease resistance, stress tolerances, and other performance traits, via queries, summary tables, and distribution maps. This Registry is the product of a collaborative effort among the US Geological Survey, the US Fish and Wildlife Service, universities, private aquaculture companies, and forty-two states.

Visit the National Fish Strain Registry via the FAR node at http://far.nbii.gov/

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